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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,169	03/01/2004	Adrian C. Moga	BEA920030024US1	1020

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EXAMINER	
LI, ZHUO H	

ART UNIT	PAPER NUMBER
2185	

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03/18/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/790,169	MOGA ET AL.	
	Examiner	Art Unit	
	ZHUO H. LI	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action is in response to amendment filed 2/4/2008. Accordingly, claims 1-17 are pending for examination and no amendment was made to claims 1-17.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weber (US PAT. 6,631,448) in view of Steely, JR. et al. (US 2005/0160430 hereinafter Steely).

Regarding claim 1, Weber discloses a cache-coherent system (figure 3) comprising a memory having a plurality of memory units (1910, figure 3), a plurality of nodes (1920-1950 figure 3) employing a coherence protocol to maintain cache coherence of the memory (cool. 5 lines 33-54), a cache (1942, figure 3) within each node to temporarily store contents of the plurality of memory units (col. 5 lines 33-54), and logic within each node, i.e., mesh coherence unit (1911, 1943, and 130 in each of node, respectively (col. 5 lines 18-25), to determine whether a cache miss relating to a memory unit, i.e., local node memory, should be transmitted to a home node or owner node based on the status stored in the coherence directory (140, figure 3 and col. 5 line 33 through col. 6 line 6 and col. 6 lines 7-40), lesser in number than the plurality of nodes based on a criteria, i.e., status information of the requested cache line stored in the coherence directory of the requesting node (col. 5 lines 55 through col. 6 line 40). Weber differs from the claimed invention in not specifically teaching logic within each node to transmit the cache miss related to the memory unit to a sub-plurality of nodes greater than one. However, Steely teaches a multi-processor system including an owner predictor control that a processor is operable to generate two parallel requests for a desired cache line in response to cache miss, i.e., one request to home node and another request to predicted target processors as predicted by the owner predictor control ([0054] through [0056]) in order to reduce latency associated with retrieving data. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Weber in having logic within each node to transmit the cache miss related to the memory unit to a sub-plurality of nodes greater than one, as per teaching of Steely, in order to reduce latency associated with retrieving data.

Regarding claim 2, Weber discloses the system wherein the criteria includes whether, to ultimately reach an owning node for the memory unit (col. 5 line 55 through col. 6 line 3), such transmission is likely to reduce total communication traffic among the plurality of nodes and unlikely to increase latency as compared to broadcasting the cache miss to all of the plurality of nodes.

Regarding claim 3, Steely discloses the system wherein the logic, i.e., owner predictor control, within each node is to determine whether the node is a home node for the memory unit to which the cache miss relates in determining that transmission to the sub-plurality of node lesser in number than the plurality of nodes is likely to reduce total communication traffic among the plurality of nodes and unlikely to increase latency to ultimately reach the owning node for the memory unit ([0050] and [0054] through [0056]).

Regarding claim 4, Steely discloses the system wherein the sub-plurality of nodes comprises an owning node (i.e. predicted target processors) for the memory unit as stored at a directory of the home node ([0050]).

Regarding claim 5, Steely discloses the system wherein the logic, i.e., owner predictor control, within each node to determine whether the cache of the node has stored a hint, as to a potential owning node for the memory unit as a result of an earlier event in determining that transmission to the sub-plurality of nodes lesser in number than the plurality of nodes is likely to reduce total communication traffic among the plurality of nodes and unlikely to increase latency to ultimately reach the owning node for the memory unit (([0050] and [0054] through [0056]).

Regarding claim 6, Weber discloses the system wherein the event includes an invalidation of the memory unit by the potential owning node (col. 6 lines 8-49).

Regarding claim 7, Steely discloses the system wherein the sub-plurality of nodes comprises a home node (180, figure 3) of the memory, and the potential owning node (i.e. predicted target processors) for the memory unit ([0055] through [0056]).

Regarding claim 8, Steely discloses the system wherein the logic, i.e., owner predictor control, within each node is to determine whether the memory unit relates to a predetermined memory sharing pattern encompassing the one or more nodes in determining that transmission to the one of more nodes lesser in number than the plurality of nodes is likely to reduce total communication traffic among the plurality of nodes and unlikely to increase latency to ultimately reach the owning node for the memory unit ([0017]).

Regarding claim 9, Weber discloses a method comprising determining at a first node, i.e., requesting node (1940, figure 3) whether a cache miss relating to a memory unit of a shared memory system of a plurality of nodes (col. 5 line 33 through col. 6 line 3 and col. 6 lines 8-49) including the first node and employing a coherence protocol should be selectively broadcast to a home node or owner node based on the status stored in the coherence directory (140, figure 3 and col. 5 line 33 through col. 6 line 6 and col. 6 lines 7-40), lesser in number than the plurality of nodes based on a criteria, i.e., status information of the requested cache line stored in the coherence directory of the requesting node (col. 5 lines 55 through col. 6 line 40) in response to determining that the cache miss should be selectively broadcast to the sub-plurality of nodes, selectively broadcasting the cache miss by the first node to the sub-plurality of nodes (col. 5 line 55 through col. 6 line 3 and col. 6 lines 8-49, and col. 6 line 60 through col. 7 line 10). Weber differs from the claimed invention in not specifically teaching to broadcast the cache miss related to the memory unit to a sub-plurality of nodes greater than one. However, Steely teaches a multi-

processor system including an owner predictor control that a processor is operable to generate two parallel requests for a desired cache line in response to cache miss, i.e., one request to home node and another request to predicted target processors as predicted by the owner predictor control ([0054] through [0056]) in order to reduce latency associated with retrieving data. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Weber in having to broadcast the cache miss related to the memory unit to a sub-plurality of nodes greater than one, as per teaching of Steely, in order to reduce latency associated with retrieving data.

Regarding claim 10, Weber discloses a method further comprising in response to determining that the cache miss should not be selectively broadcast, broadcasting the cache miss by the first node to all the plurality of nodes, i.e., network request send out by the local node with snooping request to each of node in the multiple node system (col. 6 lines 8-49).

Regarding claim 11, the limitations of the claim are rejected as the same reasons set forth in claim 2.

Regarding claim 12, Weber discloses a method wherein determining whether the cache miss should be selectively broadcast comprises determining whether the first node is a home node (1920, figure 3) for the memory unit, such that selectively broadcasting the cache miss comprises selectively broadcasting the cache miss to one node of the plurality of nodes as an owning node (1930, figure 3) for the memory unit as stored at a directory (140) of the first node as the home node for the memory unit (col. 5 line 55 through col. 6 line 3 and col. 6 lines 8-49).

Regarding claim 13, the limitations of the claim are rejected as the same reasons set forth in claim 5.

Regarding claim 14, the limitations of the claim are rejected as the same reasons set forth in claim 8.

Regarding claim 15, the limitations of the claim are rejected as the same reasons set forth in claim 9.

Regarding claims 16-17, the limitations of the claims are rejected as the same reasons set forth in claim 1.

Response to Arguments

4. Applicant's arguments filed 2/4/2008 have been fully considered but they are not persuasive.

In response to applicant's argument that Weber in view of Steely does not teach, disclose or suggest the limitation of to determine whether a cache miss relating to a memory unit should be **transmitted to a sub-plurality of nodes lesser in number than the plurality of node but greater than one**, based on a criteria, it is noted that the claimed language fails to explicitly define to submit a cache miss to x of the nodes within an **only** range such that the range as defined in the claimed invention is clearly covered by the combination of Weber and Steely.

In addition, Weber teaches a home node directory for tracking those nodes that have requested a read-only copy of the cache line so that when home node must communicates with remote nodes, it does so selectively based upon which nodes have accessed the line rather than all nodes within the sites (col. 5 line 55 through col. 6 line 6). Thus, Weber clearly teaches to transmit to a sub-plurality of nodes lesser in number than the plurality of node. Weber differs from the claimed invention in not specifically teaching to transmit to a sub-plurality of nodes

greater than one. However, Steely clearly teaches to generate two parallel requests for desired cache line so that a first request to home node and a second request to any predicted target processor(s) in order to reduce latency associated with retrieving data ([0054] through [0056]) such that Steely teaches to transmit to a sub-plurality of nodes greater than one, i.e., to submit a cache miss to the home node and the predicted target processor(s).

Thus, Weber in view of Steely suggests, teaches or discloses all limitation of the claimed invention. Therefore, Weber in view of Steely does render the claimed invention *prima facie* obvious or unpatentable.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zhuo H. Li whose telephone number is 571-272-4183. The examiner can normally be reached on Mon - Fri 6:00am - 2:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on 571-272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. H. L./

Examiner, Art Unit 2185

/Sanjiv Shah/

Supervisory Patent Examiner, Art Unit 2185